

ARL 01-37

Remarks

Claims 13-25 were pending in the Application. Claims 18-25 have been withdrawn by the Examiner. Claims 13-17 have been Rejected under 35 U.S.C. 102

This Amendment Amends Claims 13, 14, 16 and 17.

Response to Detailed Action***Election/Restriction***

The Examiner required Applicant to confirm the telephonic Election made on March 30, 2007, stating as follows:

Election/Restrictions

This application contains claims directed to the following patentably distinct species: a) DMC b) DPC c) DEC c) EMC d) THE e) DME OPC g) gamma BL h) DMSO I) NMP j) tetraethylene glycol dimethyl ether k) triethylene glycol dimethyl ether. The species are independent or distinct because they are directed to different materials for the nonaqueous solvent.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, 13 is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Response

Applicant confirms the Election of species e) DME made telephonically on March 30, 2007.

Rejection Withdrawn

Applicant gratefully acknowledges the withdrawal of the following previous Rejection:

The 35 U.S.C. 102(e) rejection of claims 13-17 anticipated by Narang et al. has been withdrawn due to applicant's affidavit filed on 2/28/2007.

Claim Rejections-35 USC § 102

The Examiner has stated:

ARL 01-37

Claims 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Bowden et al. (4329404)

Specifically

The Examiner has stated:

Claims 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Bowden et al. (4329404)

As to claims 13-17, Bowden et al. discloses an electrolyte solution, the battery comprising a lithium metal containing anode (col. 4 line 9-10), a cathode comprising carbon (col. 3 line 12-13), the electrolyte comprising a lithium salt LiPF₆ (col. 1 line 65-68), and a non-aqueous solvent comprising dimethoxyethane (col. 2 line 4).

As to the limitation, "for a metal-air battery where oxygen is reduced at a cathode surface to produce O²⁻ or O₂⁻² ions" and "for reducing the oxygen" is an intended use. It has been held that a recitation with respect to the manner in which the claimed particle is intended to be employed does not differentiate the claimed article from a prior art article satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

The limitation, "a metal oxygen battery where oxygen is reduced at a cathode to produce O²⁻ or O₂⁻² ions" is a preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478,481 (CCPA 1951).

As to the oxygen solubility of the solvent is at least 0.1150cc O₂/cc at STP, since Bowden et al. discloses the solvent desired by the applicant, it is inherent that the oxygen solubility of the solvent is at least 0.1150cc O₂/cc at STP.

Response

Applicant has Amended Claims 13, 14, and 16 to remove the description of the metal-oxygen battery and the lithium-metal battery from the preamble of the Claims and inserted it into the body of each Claim to indicate the limitation on the use of the novel electrolyte to an **oxygen-metal/lithium-metal** battery. Applicant has further Amended Claims 13, 14 and 16 to focus on the novelty of Applicant's Invention, which is the recognition that contrary to conventional wisdom regarding electrolytes for **oxygen-metal** batteries in which electrolytes were selected based on dielectric constant and boiling point, the performance of an **oxygen-metal** battery correlates directly to the ability of the electrolyte to solvate oxygen. See Application paragraph [0013]

ARL 01-37

Bowden, *et al.* describe the use of DME as a solvent into which lithium perchlorate can be dissolved to form the salt $\text{Li}(\text{DME})_2\text{ClO}_4$. This salt is then dissolved in SO_2 to form the electrolyte. As described in claim 1, line 7, the Bowden, *et al.*'s cell is "substantially free of said ether which is uncomplexed."

The complex salts of the present invention are made, for example, by dissolving a salt such as lithium perchlorate into an ether such as DME. As the perchlorate dissolves, the solution becomes warm and as the solution cools to room temperature a precipitate forms. The precipitate is removed and dried to give a white solid material which is the electrolyte salt of the present invention. The salt is believed to have the stoichiometric formula $\text{Li}(\text{DME})_2\text{ClO}_4$. The obtained salt when dissolved in SO_2 provides a clear solution.

Hence Bowden, *et al.* does not teach the use of DME as an electrolyte solvent for use in a metal-oxygen battery. Bowden, *et al.* teaches the use of DME to form an electrolyte salt, hence, Bowden, *et al.* teaches a completely different use of DME than Applicant's Invention, which recognizes the advantage of the use of DME and other solvents having an oxygen solubility higher than 0.1150 cc O_2/cc solvent. See Application paragraph [0017]. Moreover, Applicant discloses that the judicious mixture of solvents with an oxygen solubility of greater than 0.1150 cc O_2/cc with solvents of a lower than 0.1150 cc O_2/cc oxygen solubility produces electrolytes which significantly enhance the performance of **oxygen-metal** batteries. Applicant has further Amended Claims 13, 14 and 16 to limit the Claims to a combination electrolyte where the mixture forming the electrolyte is such that the oxygen solubility of the combination solvent is greater than 0.1150 cc O_2/cc . While Applicant disclosed at paragraph [0015] of the Application that the solvent portion of the electrolyte could be composed of either a single component or a plurality of components, the discussion in paragraphs [0018] and [0019] shows that the inventive aspect is the appreciation that it is an oxygen solubility greater than 0.1150 cc O_2/cc that is important. Neither Bowden, *et al.* nor any of the previously cited references disclose nor made obvious the combination of at least one solvent of an oxygen solubility greater than 0.1150 cc O_2/cc with at least one solvent of an oxygen solubility less than 0.1150 cc O_2/cc so that the resulting combination would have an oxygen solubility greater than 0.1150 cc O_2/cc .

As stated in the Manual of Patent Examining Procedure (MPEP) Eighth Edition, August 2001, Latest Revision August 2006, at paragraph 2131 "TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM 'A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.' Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)." In this case, Bowden, *et al.* does not teach the use of DME as a solvent. It discloses and teaches the use of DME to form a salt believed to have the stoichiometric formula $\text{Li}(\text{DME})_2\text{ClO}_4$ and to dissolve that salt in electrolyte solvent SO_2 to form the electrolyte. In fact, the use of the ether, i.e., DME as described in Claim 1 requires that the cell be substantially free

ARL 01-37

of the ether in an uncomplexed state showing the Bowden, *et al.* did not contemplate the use of DME as an electrolyte/electrolyte solvent and hence cannot anticipate such a use by Applicant:

"1. A non-aqueous electrochemical cell comprising an anode, a cathode and an electrolyte solution comprised of an electrolyte salt dissolved in an electrolyte solvent characterized in that said electrolyte salt comprises a metal salt complexed with a stoichiometric amount of an ether and wherein said cell is substantially free of said ether which is uncomplexed." (emphasis added)

There is nothing in the Patent to show that there would be an increased turn-off gain; and, in fact, under the conditions that Edmond, *et al.* describe, there would not be; hence, Edmond, *et al.* cannot anticipate Applicant's Invention.

Conclusion

Applicant believes that the Amendments made above respond to each and every one of the Examiner's Rejections and are such as to place the Application into Condition for Allowance. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

The Examiner is invited to telephone the undersigned at the local telephone number given below if, after considering this amendment, the Examiner is of the opinion that the Amendments made by Applicant have not resolved all outstanding issues in this case and brought the case into Condition for Allowance.

Respectfully submitted,

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